Appendix F

Conservation Action Workshop Summaries Spring 2005

In the course of the regional reviews of stressors affecting wildlife and habitats and the actions needed to restore and conserve wildlife diversity, several key issues repeatedly surfaced. The Wildlife Diversity Project convened workshops, each attended by 15 to 30 experts and stakeholders, to identify challenges and opportunities regarding these issues and to develop recommendations for action. The key issues and their related workshops are:

Integrating Wildlife Conservation into Local Land-Use Decisions (Two workshops) —Local and regional land-use decisions guide growth and development. Preventing the unnecessary loss of wildlife resources requires that conservation be integrated into local and regional land-use and development decision processes.

Restoring and Conserving Riparian Habitat—The regional reviews found that multiple stressors have eliminated or degraded riparian habitat—one of the most important habitat types for maintaining wildlife diversity. A more comprehensive effort is needed to restore and conserve riparian habitats.

Ensuring Water for Wildlife—Water resources are contested throughout the state and the cost of water is increasing. Ensuring water for wildlife through planning and long-term contracts is essential for maintaining wildlife diversity in the future.

Controlling Invasive Species— Invasive species negatively affect wildlife across the state, and it is apparent that more comprehensive statewide solutions are needed to prevent species invasions and to control and eradicate invasive species.

Expanding Wildlife Conservation Education—The future of California's wildlife is dependent on strong public support for public investment in conservation and support for necessary habitat restoration and wildlife conservation projects and programs. Educating California's youth and the public about the state's wildlife and the needs of conservation are essential to build public support.

In spring 2005 the Wildlife Diversity Project facilitated a series of workshops on the key issues listed above. Participants in each workshop discussed one of the issues in depth.

Note: The following summaries of the results of the conservation action workshops reflect the collective discussion and general conclusions of the workshop participants, and they do not necessarily reflect the views of the Department of Fish and Game, the Wildlife Diversity Project at UC Davis, or any individual participant.

Integrating Wildlife Conservation into Local Land-Use Decisions May 25 and 26, 2005

Note: The following summary of the results of this workshop reflects the collective discussion and general conclusions of the workshop participants and does not necessarily reflect the views of the Department of Fish and Game, the Wildlife Diversity Project at UC Davis, or any individual participant.

The Issue

Land-use decisions made at the county and municipal levels define the landscape. Without specific policies, regulations, or plans, land-use decisions are often reactive in response to a developer's plans for residential or commercial development. The need for housing, tax revenues that come from commercial development, the desire for recreation and open space, and necessary infrastructure are just some of the pressures on California's lands as its population continues to grow. Short-term, reactive land-use decisions lead to unnecessary loss of California's wildlife resources.

Current Situation

Wildlife conservation is generally not considered in local land-use decisions, and the state lacks policies, funding, or standards for integrating wildlife conservation into local and regional actions. The issues in integrating wildlife conservation into local land-use decisions are planning; regulations and incentives; funding and infrastructure; leadership; and public awareness and support. The overarching context for these issues is the economic pressures confronting local governments. These pressures encourage new commercial development that generates tax revenue for basic public services.

Project-by-project development review does not conserve wildlife.

Local land-use planning is typically done at a project level. But wildlife conservation on a project-by-project basis is not effective; it must be addressed on a broader, landscape scale.

The lack of an integrated planning approach among state, regional, county, and local entities works against a viable wildlife conservation strategy. Moreover, wildlife conservation is not integrated with planning for transportation, floodplain management, and agricultural conversion.

Wildlife conservation has largely had a species-specific, reactive approach, focusing on threatened and endangered species or on a habitat "hot spot," rather than a proactive focus on regional landscapes and ecosystems.

Local land-use decision-makers are not likely to consider wildlife conservation unless they have given the issue consideration in a comprehensive planning process or are required to do so through CEQA.

There are not adequate regulatory requirements or incentives to facilitate integrating wildlife conservation into local land-use decisions.

Statewide policies do not require local agencies to plan for conserving wildlife. Incentives might include local grants, streamlined regulatory processes for addressing wildlife impacts, or flexibility in projects with tools like mitigation banking or the transfer of development rights.

Flexibility is important, whether in regulatory requirements or incentives, to allow for differences between rural and urban landscapes and different situations throughout the state. There is also recognition that existing processes and regulations are obstacles to wildlife conservation; e.g., development ordinances that make it difficult or impossible to build in an environmentally sensitive manner.

Local jurisdictions need either a "carrot" or a "stick" to integrate wildlife conservation into land-use decisions. If they are required to plan for and address wildlife, funding will be necessary.

Local governments generally lack the resources in funds, staff time, data, and information to protect wildlife at the local level.

Funding and attention to green infrastructure (open space, greenways) is inadequate. There is a lack of funding and capacity for integrated, long-term planning, for habitat acquisition, or for wildlife conservation operations and management.

What opportunities there are for funding are limited by a very competitive environment; if competing with health and human services or with housing needs, wildlife will be at the end of the line. If funding does become available, it is typically on a one-time basis or tied to capital investments. There is a lack of dependable funding available over a period of time.

There is a sense that existing data are not sufficient to inform local decision-making. Moreover, there are no state or regional priorities or standards for addressing wildlife conservation on a broader scale.

Leadership at the local level is key to integrating wildlife conservation into local land-use decisions.

Leadership is about local decision-makers and elected officials having a long-term, proactive vision. It is about choosing long-term quality of life over short-term economic gains. It is about demanding and financing research and planning to guide growth and development. Leadership is also about seeing the opportunities and benefits of planning integration and of working across geopolitical boundaries and across agencies. It is seeing the big picture and considering long-term issues.

Elected officials and planning committees are limited by their terms of office and by the nature of the job. They are expected to be experts in everything from waste management to budgets to conservation. They are limited by the pressures of balancing diverse and competing interests. Administrators are limited by institutional inertia and bureaucratic systems that fragment projects and are obstacles to systemic, integrated approaches. And in the absence of guidance for planning, regulation, or policy, they are limited in their ability to impose direction.

The level of public awareness, understanding and support regarding wildlife conservation affects decisions of local elected officials and administrators.

Communities and individuals need to be engaged at all levels to facilitate new approaches to local land use and to bring about individual behavior change. There is considered to be a general lack of knowledge or passion for integrating conservation into local land-use decisions; wildlife conservation is not included in most people's definition of quality of life. And while people may know about biodiversity, endangered species, or specific species, they are less aware of the relationship between wildlife conservation and land use. But without citizen outcry, a long-term vision for wildlife conservation will be neglected, and wildlife will be overlooked.

Needs Identified

Improve conservation planning for wildlife.

- Mandate and fund (or provide incentives for) integrated conservation planning and implementation (like the NCCP) or through the county General Plan process.
- Develop and provide the scientific data and information to the planners and decision-makers.
- Create a biological framework, standards, and priorities for wildlife planning and conservation.
- Create, implement, and fund statewide policies for integrating wildlife conservation into local land-use planning.

Strengthen state and local leadership for conservation planning.

- Define responsibilities at state and local levels for wildlife conservation, and expand Fish and Game's capacity to assist local governments with conservation planning.
- Coordinate wildlife conservation across state agencies.
- Encourage, support, and provide examples of long-term planning, and provide examples of the economic and quality-of-life benefits of wildlife conservation.

Generate public support.

- Provide incentives for private landowners to undertake wildlife conservation.
- Encourage market-based approaches to land stewardship.
- Increase awareness about landscape-scale wildlife conservation.

Ensure adequate funding.

- Secure more program funding for conservation and for operations and maintenance. (See Chapter 4, Strengthening California's Conservation Capabilities, page 39.)

- Integrate wildlife conservation into development funding for transportation and other infrastructure.

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Controlling Invasive Species That Affect Native Wildlife
May 10, 2005

Note: The following summary of the results of this workshop reflects the collective discussion and general conclusions of the workshop participants and does not necessarily reflect the views of the Department of Fish and Game, the Wildlife Diversity Project at UC Davis, or any individual participant.

The Issue

Invasive species, including animals, plants, and pathogens, are ranked among the major statewide stressors affecting California's native wildlife, but the state does not have an adequate program or legal framework to address their prevention, monitoring, control, and eradication. Currently, Fish and Game has only one position to coordinate the state's invasive species control efforts, and several state agencies have people working on scattered invasive species projects. For invasive species cases that threaten agricultural crops, however, the state has a well-defined program, a powerful legal framework, and funding to aggressively implement control and eradication efforts. California needs a more substantial policy and legal framework with clear direction regarding their prevention, control, and eradication, to reduce the effects of invasive species on wildlife.

With the possible exception of alpine natural communities, California is remarkably vulnerable to species invasions, and almost all of the state's ecosystems are at risk. Riparian systems, estuaries, deserts, grasslands, forests, and Mediterranean ecosystems are all under siege. Freshwater systems and islands are especially susceptible to species extirpations caused by invasive species. Invasive plants like medusahead and French broom harm wildlife directly by producing harmful awns and seeds. Introduced fishes can directly compete with native species, prey on them, or hybridize with them. The invasive pathogen Sudden Oak Death destroys acorn-producing trees, an important food source for native wildlife. In addition to direct harm to wildlife, invasive alien species such as arundo also cause widespread degradation of wildlife habitats.

Current Situation

Although there is significant activity directed toward prevention and management of invasive species, these efforts do not add up to a cohesive, coordinated program.

A substantial amount of invasive-species work is being conducted by diverse groups throughout California. The agencies working on invasive species generally agree on the approach. The problem, however, is that the state's geographic size and diversity of habitats make it difficult to set priorities for such work. There is presently a hodge-podge of policies and procedures concerning invasive species but no overarching policy.

Good lists of invasive species exist for plants and animals, but the data are scattered in various locations.

Invasive plants are well identified in the California Invasive Plant Council database, and life-history and control information is available for many of the 300 species on the list. At present, CAL-IPC is regionalizing the list to make it more relevant to land managers.

Lists of invasive terrestrial animals are located in a few places. The National Park Service manages a database called NP Species that covers terrestrial and aquatic invasive vertebrates in national parks and adjacent lands. The NP Species list is prioritized for management action. The U.S. Geological Survey has an invasive vertebrates list. Fish and Game maintains a list of animals that are prohibited for import (not necessarily invasive species). A federal list of injurious animal species is maintained by the Department of the Interior.

Some lists cut across species groups. The California Aquatic Invasive Species Management Plan includes aquatic plants and animals in freshwater and marine habitats. Lists of invasive pathogens seem to be less well developed. Most of these lists and databases identify new invaders to watch for so they can be immediately treated.

Setting priorities for invasive species work is difficult due to California's great size and diversity of habitats.

Some work on risk factors of invasive species is being done at the University of California, Davis, and elsewhere, but a useful framework for prioritizing efforts on ecological and taxonomic criteria is still lacking.

Priorities might include controlling invasive species in California's protected areas like state or national parks or focusing on controlling invasive species in representative habitats of each region of the state through prevention, early detection, and eradication and control of existing invasive species populations. Prioritization of invasive species management should be based on scientifically based strategies.

The Department of Food and Agriculture has a well-managed, comprehensive program and policy framework for preventing and managing invasive species that threaten agriculture. Agricultural inspection stations at state borders, early detection and eradication authority and capacity, and funding sources (even though declining) are all in place to address the threat of invasive agricultural pests, but there is no such system for invasive species that pose threats to wildlife. Several parts of a system exist through executive orders and the individual efforts of some agencies and nongovernmental organizations, but the effort remains less than a coordinated, effective program.

Some existing efforts:

- California Fish and Game Commission is now reviewing its policy regarding the introduction of exotic species to include exclusion of invasive species.

- CALFED's 2000 strategic plan discusses and allocates funding for invasive species.
- State Lands Commission has oversight for aquatic invasive species through ballast water and hull fouling.
- California Department of Water Resources has some educational programs aimed at prevention but no funding to implement them.
- California Division of Forestry considers forest pests and pathogens.
- California Department of Boating and Waterways considers aquatic plant management.
- California Department of Public Health samples for invasive species and human-health pathogens.
- California Water Resources Control Board is addressing non-native amphibians in reservoirs.
- California State Parks manages and conducts research on invasive species.

A current gap in the policy framework is the lack of capability to respond rapidly to new invaders, including funding, prior environmental review, and authority for fast action when the need arises.

Federal fire response now includes invasive species control after the fire, and it is integrated with local efforts through the Burn Area Emergency Rehabilitation and fuel-load control programs. The National Park Service is working to gain authority to work on adjacent lands, and the Department of Defense has a memorandum of understanding with the state of California to work on adjacent lands.

Needs Identified

Create a state coordinating body for invasive species management.

- Create a program with a lead agency at the statewide level, and establish a non-native invasive species advisory council with broad overview and agency representation.
- Compile all the existing invasive species lists, and organize this list on a common data platform as a Web-based decision support system for easy accessibility.
- Identify the leading mechanisms through which invasive species enter the state, and develop the actions to prevent their entry. The various organizations working on invasive species lists are good candidates to do this, beginning with the Department of Agriculture's extensive experience on this topic.
- Develop criteria for prioritizing invasive species projects and funding by geography, stage of invasion, and the cost-benefit of actions.
- Create regional invasive species strategies that outline key species, key constituencies, sources of funding, and an action plan.
- Develop a priorities plan and funding for freshwater systems, beginning with alpine ponds and moving toward more complex systems like valley rivers.

Develop rapid response capacity to identify and eradicate early invaders.

- Develop a rapid response model like the Office of Spill Prevention and Response program, with a rapid response team and emergency fund to tackle new invasions. Cooperative Weed Management Areas groups, watershed groups, and resource conservation districts could be part of the rapid response team.
- Develop early-warning protocols.
- Elevate the priority of research on prevention methods.
- Properly staff existing agricultural check stations.
- Expand emergency eradication provisions from noxious weeds to animals.
- Prepare programmatic environmental reviews under the California Environmental Quality Act and the National Environmental Protection Act, to be completed in advance of the need for emergency response.
- Establish a multidisciplinary research center with dedicated staff to study priority issues.

Engage key audiences and stakeholders on how they can reduce the threat to native wildlife posed by invasive species.

- Conduct a general education program to engage members of the public in prevention and to foster increased support.
- Include invasive species in leadership training for community leaders, including agency leaders, master gardeners, pet store owners, and local elected officials.
- Encourage the use of horticultural species and pet species that are not potentially invasive species in California. Publish lists of preferred species and likely invasive species, such as the one published by the Missouri Botanical Garden, to help consumers choose products. Consider nursery certification and plant labeling. Work with the aquarium industry to prevent releases of invasive aquatic species.

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Ensuring Water for Wildlife
May 23, 2005

Note: The following summary of the results of this workshop reflects the collective discussion and general conclusions of the workshop participants and does not necessarily reflect the views of the Department of Fish and Game, the Wildlife Diversity Project at UC Davis, or any individual participant.

The Issue

There is increasing urgency to secure water for the long-term benefit of wildlife, particularly in light of the increasing demand for consumptive use of water. Water distribution and management are complex and legally constrained. Water's quality and quantity and the rising cost to supply water are critical for wildlife management throughout California. Integrated planning across agencies, political boundaries, and geographic scales, along with innovative approaches to water finance, storage, and transfers, offer opportunities to secure water for wildlife needs while providing water for agricultural and domestic uses. The relicensing of hydropower projects through the Federal Energy Regulatory Commissions (FERC) process is also an opportunity to improve conditions for aquatic ecosystems and riparian habitats and species.

Most of California's wildlife species depend upon wetlands, lakes, rivers, and riparian habitats at some point in their life cycles. Degradation of habitat is often the consequence of failing to ensure adequate water for wildlife. Habitat and species loss may be due to changes in water quantity or quality, salinity, flow rates, temperature, seasonal flow patterns, or groundwater levels. These changes may also facilitate the establishment of non-native species.

Current Situation

The workshop participants focused on several current conditions, which were especially complex due to the entanglement of public health concerns, water laws and policy, and the ecological requirements of wildlife.

Water quality, quantity, and timing all have an effect on wetlands for wildlife.

Wetlands support hundreds of species, including waterfowl and other birds, fish, amphibians, and invertebrates. The condition and management of wetlands depends on water. The quantity, quality, timing, and cost of water are all important issues for sustaining wetlands. Some wetlands are also integrated into providing ecosystem service to the local community, processing stormwater or sewage drain water. This water may not only be substandard in its quality, but the quantity can be erratic in volume and timing.

Maintaining wetlands also involves other issues, such as mosquito abatement, particularly now with the arrival of West Nile virus in the region. Wetland refuges are charged for mosquito abatement, a substantial expense, and the pesticide spraying causes ecological damage to wetland invertebrates and the aquatic food chain.

Altered stream flows affect wildlife.

Migratory and reproductive behaviors of many species can be affected by changes in a river's seasonal flow patterns. Not only are the cues of rising or falling water volumes disrupted, but necessary habitat may be lost due to excessive or restricted scouring or bank overflow. Water storage for flood control and consumptive uses, as well as out-of-basin water transfers, affect the quantity, quality, and timing of water in California's rivers and streams. Large dams trap sediments, changing the physical nature of downstream habitats. Altered water temperatures and saline intrusions from the Pacific Ocean can also disrupt breeding and animal nursery habitats and changes in species composition. Over the next 10 years, relicensing of hydropower dams through the FERC process will provide opportunities to improve instream flows for wildlife.

Changes in land use and agricultural production can directly affect the water and habitat available for wildlife.

Conversion of agricultural lands to urban centers may change the water flow pattern of an area, as well as the amount of available habitat for wildlife. Rice production in the Central Valley provides significant waterfowl habitat, which is lost when those lands are converted to other crops or are developed. Currently, water transport ditches, as well as adjacent habitat fed by the leaky ditches, can themselves provide food and habitat for wildlife. Water-use efficiencies gained by lining or covering ditches, while increasing the amount of water for use downstream, can also result in a loss of habitat.

Water policy and laws do not adequately consider wildlife values.

California continues to become an increasingly urban state, with water laws and policies that address human needs and limit water use for wildlife conservation purposes. Over-allocation of water resources creates a competitive situation for limited water in a complex legal and institutional framework. The focus currently is on regulation, but future efforts need to add a cooperative, willing-seller approach for long-term solutions. Currently, ungauged water use keeps some water rights holders from participating in transfer discussions under California Water Code section 1707. In addition, conflicting policies and laws must be addressed, such as the spraying for mosquitoes in wetlands with nonspecific pesticides.

Regional integrated planning needs to fully consider wildlife needs.

Wildlife conservation objectives and obligations are not adequately represented in regional integrated planning projects. Out-of-basin water transfers complicate integration of projects within a region,

because not all of the available water is being used within the watershed. Additional incentives and adequate staffing from agencies are needed to fully represent wildlife in regional water planning and the FERC hydropower relicensing processes.

Climate change adds long-term uncertainty and the likelihood of seasonal changes in precipitation that must be addressed through changes in storage and distribution systems, and these changes should be considered in the long-term water planning for wildlife conservation and other water demands.

Insufficient funding for supplemental water supplies for wetlands and instream flow is a major concern for wildlife conservation.

The cost of purchasing water for wetlands on the market, especially the spot market, can be very expensive and unpredictable and is becoming more difficult with declining agency budgets. Permanent or long-term water leases for wetlands are needed to replace spot market purchases, but additional public funding is often not available.

Needs Identified

Needs are presented in groups that reflect the major issues identified in the Current Situation Section, with some melding and reorganizing of issues.

Improve water quality, quantity, and timing for wildlife.

- Acquire sufficient water for fish and wildlife resources.
- Effectively implement existing state and federal mandates for environmental flow.
- Create a water transfer clearinghouse for easy reference in order to facilitate analysis and impact assessment and design sufficient mitigation.
- Have resource agencies collaborate to secure benefits for wildlife through the FERC hydropower project relicensing process.
- Establish a science advisory committee with wildlife conservation expertise to advise water-quality and water-supply agencies statewide.

Support regional integrated planning.

- Planning should be integrated, comprehensive, and strategic, and should involve all stakeholders.
- State and federal agencies and nongovernmental organizations that work at the state and national levels must be trained in how to work with locally and regionally driven planning and funding processes.
- Ensure that qualified science and wildlife expertise is brought into the regional planning efforts through qualified state and federal agency staff and expert contractors.
- Dedicate additional agency staff to work on the FERC process at this critical time.

- Encourage the legislature to monitor and strengthen regional integrated water planning such as that currently occurring with Proposition 50 funding. (Prop. 50 provides project funding to local agencies if the project is consistent with an adopted regional integrated water management plan.)

Develop funding and incentives.

- Develop a water transfer fee or in-kind requirement that all water transfers include and allocation of water for wildlife.
- Assess an acre-foot fee statewide on water use devoted to aquatic ecosystem and wildlife conservation.
- Determine what the implications are for wildlife conservation regarding the "beneficiary pays" approach.
- Develop a water trust.
- Develop a public trust advocate office at the State Water Resources Control Board.
- Ensure that future resource or water bonds pay for proposed enhancements.
- Identify interstate funding opportunities and develop partnerships to lobby Congress; e.g., secure funding for wetlands restoration as has been secured for salmon and steelhead restoration).

Apply sound science to water and wildlife decisions.

- Establish performance criteria and compliance monitoring on water use agreements and for other programs and projects.
- Assess FERC hydropower project effects on aquatic and riparian ecosystems and on wildlife.
- Incorporate adaptive management approaches into policies and projects.
- Develop the information needed to better understand the water needs of wildlife.
- Establish the California equivalent of the National Academy of Sciences to enable rapid development of new information and to resolve scientific disputes.

Workshop Participants

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Restoring and Conserving Riparian Habitats to Maintain Wildlife Diversity May 12, 2005

Note: The following summary of the results of this workshop reflects the collective discussion and general conclusions of the workshop participants and does not necessarily reflect the views of the Department of Fish and Game, the Wildlife Diversity Project at UC Davis, or any individual participant.

The Issue

Restoring and conserving riparian habitat are essential to conserve wildlife diversity across the state, whether in the desert, the Sierra, or the Central Valley. Perhaps no other habitat type is as demonstrably critical to California wildlife as is riparian habitat. Many studies indicate that riparian habitats are vital to the vast majority of wildlife species.

Riparian habitats have been affected by numerous activities, including, among others, development, water diversions, groundwater overdrafting, grazing, timber harvest, and farming. Though barriers exist to be addressed, there are also good opportunities to restore and conserve riparian habitat on both public and private lands. Furthermore, the remaining riparian habitats are so essential for wildlife, they warrant special protection and attention.

Current Situation

At present, riparian areas are in decline in many areas of the state. This workshop focused primarily on flood management, land development, grazing and agricultural use, and water management as the principle factors affecting riparian habitats and wildlife.

Flood Management

In 1907, the *Report of California Debris Commission with Regard to Affording Relief from Floods in the Sacramento Valley and the Adjacent San Joaquin Valley* proposed a comprehensive plan for river rehabilitation, development, and flood control. The final plan, known as the Jackson Report, established the original Sacramento River flood control design, which has set a standard for riparian management in other parts of the state. Its design did not account for the benefits of riparian systems or other ecological functions. Key standards of the Jackson Report include:

- Keeping the river clear of vegetation.
- Minimizing land take, which means maintaining narrow riparian areas.
- Minimizing construction costs.
- Ensuring scour of mining debris. (**Riprap** and levees in the original design have been successful in producing scour but are now encouraging an undesired degree of in-channel erosion.)

In the 1950s, operations and maintenance manuals formalized maintenance practices based on the Jackson Report. These practices typically have negative consequences for riparian habitats. In the 1970s, the Clean Water Act (CWA) and Endangered Species Act (ESA) were enacted but did not result in update of operations and maintenance manuals.The Jackson Report standards and current practices often are in diametric opposition to the complex and conflicting permit requirements of the CWA, ESA, and other conservation laws.

Complicating the current situation are multiple agencies having pieces of authority over riparian areas and floodplains, conflicting missions within and among agencies, and management practices created before present knowledge of conservation values and science was available. Currently, all the liability for compliance with conservation legislation rests with the agencies responsible for flood-control maintenance.

Conflicting missions within and among public resource agencies are common. Large dams are managed for multiple purposes, not just flood control, affecting river flow patterns and timing, and flood-control constraints may limit restoration options. The demands on the water conveyance system levees and canals increase erosion and place stress on the flood control infrastructure.

Where fish weirs are installed at water diversions, large woody debris, usually important for aquatic ecosystems, can pile up and create a flood-flow barrier. Inadequate and disparate funding sources are not conducive to effective integration of flood management and habitat restoration. There is no centralized forum to resolve proactively the fundamental policy issues of floodplain management and habitat restoration. Flood control and restoration are both trying to occur inside the levees, creating areas of conflict.

Management practices in the floodway are based on weak science and outdated rules. Standards and practices are derived from the single focus of the Jackson Report. But neither the mandate of public safety or stewardship of natural resources is met.

Development Issues

Land development presents a host of challenges for riparian habitats and wildlife. In residential development, inadequate setbacks and protection of streams and riparian areas are common, and waterways are often constricted, altering river flow patterns and reshaping waterways. Moreover, without adequate water, new development can lead to excessive demands on surface and groundwater sources. Much of the consumed water in residential developments is returned to river systems through urban runoff, stormwater drains, and sewage treatment outfalls, introducing pollution to the aquatic environment.

Land development frequently causes fragmentation of waterways, impeding their use as wildlife travel corridors. Invasive species, both exotic weeds and animals, are often introduced near developed areas, and they often thrive in disturbed habitats.

In many developed areas, on both public and private lands, stewardship of riparian areas is often neglected. Local agencies may not be informed regarding appropriate, ecologically sound management of riparian areas. Recreational uses of riparian areas can affect wildlife, disrupting their use patterns and chasing them from prime habitats.

Regional coordination of planning and regulation is uncommon at the city and county level, and cities are not consistently included in watershed programs. In rural residential developments, vegetation management for fire prevention and fire recovery has significant consequences for riparian areas.

Agricultural Land Conversion, Grazing and Agricultural Land-use Issues

California continues to lose agricultural land to other developed uses. As agricultural land disappears, its wildlife value is forever lost.

There are a number of barriers to riparian restoration in an agricultural setting. The agricultural community often has a negative perception of restoration and how it may conflict with agricultural production. Riparian restoration takes both time and money. Private landowners may have inadequate information or experience to design, budget for, and implement riparian restoration projects.

Riparian systems and riparian species are subject to a regulatory process that can deter landowners from engaging in restoration efforts. The burden of long-term management of these restored areas may be daunting. Funding opportunities are not well known among private landowners. The restoration community often has not effectively engaged private landowners.

Successful riparian restoration may have downsides for the agricultural landowner. Restored riparian areas could attract pest species. Restoring habitat that may attract endangered species is a concern for landowners, because it may lead to restrictions on their land or their neighbor's land. Outdated conservation guidelines for threatened and endangered species add to the uncertainty. In addition to the species-related effects of restoration, physical effects can influence landowners. Flood levels, seepage, and buildup of sediments can affect agriculture operations. Overall, better information needs to be provided to landowners regarding habitat restoration.

In addition to those listed above for general agriculture, several riparian issues are specific to ranchland. Riparian restoration may mean a loss of grazing areas. There is a general perception that there can't be a balance between grazing and riparian conservation. Managing grazing on riparian habitats of public lands is difficult, expensive, politically charged, and sometimes unenforceable. Restoration and changes in management of adjacent rangelands are often necessary for successful riparian management.

Water Management Issue

Water is often used in California in ways not consistent with the limits of available water. Acres of residential and commercial lawns, golf courses, and some high water-use crops (such as rice and cotton) are common in the state. The existing legal framework supports this misuse of water. The connec-

tion of groundwater to surface water is completely ignored in law. The water allocation and conveyance systems ignore ecosystem values, leading to modified flow regimes and channelization that do not support biodiversity. Instream flow protection laws are weak and almost always aimed at a single endangered species rather than riparian systems.

Making changes in agencies that have functions that affect water for riparian habitat is challenging. Incomplete knowledge of methods to manage for ecosystem benefits exists across all agencies, and agency inertia, fear of change, and existing political structure are hard to alter. Water management is presently approached from an engineering perspective, with little consideration of ecosystem needs, and agencies responsible for maintaining ecosystems are not the decision-makers.

The management of complicated water systems (such as the Sacramento–San Joaquin Delta) for a wide variety of sometimes-conflicting benefits has become enormously complex, which makes changes to benefit riparian habitat more difficult to implement.

Needs Identified

The overall discussion focused on cooperation among the many players in riparian issues: the legal and regulatory environment; funding; and science. Overall, there is so little riparian habitat left that we should be looking to preserve the remaining habitat while creating additional riparian habitat.

We don't have a statewide riparian policy, but we need one. Elements of riparian conservation should involve restoring more natural flow regimes, accommodating over-bank flooding, enlarging levee setbacks, and removing riprap where needed. The public policy need is to figure out how to develop the consensus for restoration and conservation and how to fund it. Education of local decision-makers is key. There is an opportunity to look for situations where goals overlap; e.g., greenways, riparian, and flood control projects. Demonstration projects will be needed to promote best practices and to illustrate the benefits of more natural systems.

Create an ongoing forum of state and federal agencies and nongovernmental organizations to develop a collective vision using present-day conditions that balances conflicting interests of floodplain management.

- Create a process like Cooperative Agreements to prioritize, fund, and implement the vision that's created and to address dispute resolution.
- Use the best-available current science and law to clarify and update operations and maintenance manuals and flood management regulations.
- Update practices relating to sedimentation and erosion repairs and threatened and endangered species concerns.
- Pay more attention to urban creeks, now impacted by rapid and polluted runoff. Consider flood management and riparian conservation in development decisions.

- Develop peer-reviewed guidelines on a regional basis (e.g., Sacramento Valley).
- Include design standards for development to maintain or restore more natural stream flows.
- Investigate the economic benefits of reducing runoff at the source instead of increasing the need for flood control, by instituting practices such as establishing local groundwater recharge areas rather than channeling water out of the region.
- Integrate recreation, education, and riparian habitat in greenways, and look at the economic benefits of that integration (e.g., property values).
- Identify mechanisms to fund greenway purchase and maintenance.
- Develop incentives for action by private landowners in restoration and maintenance of riparian areas (e.g., state tax credit).
- Support Weed Management Areas with funding.

Engage grazing and agricultural land users.

- Develop competitive compensation for farm and ranchland through easements or fee title, building on existing programs (e.g., Conservation Reserve Enhancement Program).
- Streamline and consolidate permitting processes for restoration projects.
- Develop Safe Harbor Agreements that encourage landowners to manage lands in ways more beneficial for endangered species and ecosystems.
- Improve the Candidate Conservation Agreement Assurances and provide funds to farmers for preparing Safe Harbor Agreements.
- Encourage programmatic biological opinions and environmental review for large-scale restoration projects.
- Decrease the farmers' cost-share rate for USDA conservation programs.
- Increase funding to programs that include conservation easements with seasonal and use restrictions.

Modernize water management practices.

- Redesign flood control systems to allow for riparian restoration.
- Integrate engineers with conservationists.
- Publicize case studies that are working; e.g., Upper Truckee and the Hamilton City project on the Sacramento River.
- Adjudicate groundwater.
- Inventory and map riparian habitat to provide a baseline for setting goals with regard to water management.

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Expanding Wildlife Conservation Education
May 23, 2005

Note: The following summary of the results of this workshop reflects the collective discussion and general conclusions of the workshop participants and does not necessarily reflect the views of the Department of Fish and Game, the Wildlife Diversity Project at UC Davis, or any individual participant.

The Issue

Wildlife conservation education seeks to repair the disconnect between people and nature. The goals of wildlife conservation education in California include improving the stewardship of wildlife and their habitat; promoting and facilitating wildlife conservation awareness, appreciation, and knowledge among youth and adults; developing an informed public that understands cause and effect of human activities on wildlife and their habitats; and providing statewide universal access to wildlife conservation education for youth from kindergarten to 12th grade.

Achieving these goals requires increasing the quantity and quality of conservation education programs available to youth and adults and providing sustainable funding for those programs. Pooling of resources, coordinating wildlife education delivery systems, and finding ways to help teachers bring wildlife education into their curricula are necessary parts of breaking down barriers to wildlife education in formal education. In addition, wildlife conservation education must address the misconceptions and lack of correct information regarding science and wildlife. It must also address cultural and demographic changes in the state if it is to be relevant to an urban and increasingly diverse population.

Improving wildlife conservation education throughout the state will create a population that is more informed, engaged, and involved in issues of wildlife conservation and environmental sustainability. This population will be better able to understand and make decisions about the complex interactions among humans, wildlife, and the environment.

Current Situation

Wildlife education has a variety of obstacles to overcome if it is to be broadly available to K-12 youth, as well as to adults.

Several barriers exist to delivering wildlife education in the formal education setting.

There is a shortage of trained, knowledgeable teachers who are willing to teach wildlife education. Teachers typically are overcommitted with their existing work and so may not be eager to teach another program. Many teachers don't see outdoor experiences as relevant, don't understand the im-

portance of wildlife education, and do not know that it is compatible with state standards. In addition, the California content standards above 7th grade don't encourage wildlife education.

The wildlife-education delivery system could be better coordinated.

A variety of outdoor education programs are available to children, youth, and adults—Project WILD and Project Learning Tree are examples—yet only a small percentage of the state's school-aged children are reached. Some programs have expanded their material to reach a broader audience, including curricula for pre-K and college students.

Agency resources are not efficiently utilized to facilitate wildlife education for a broader audience. Moreover, agencies could improve partnering with the staff of nongovernmental organizations and recreational leaders, who are well-suited to provide nonformal wildlife education.

Misconceptions and lack of correct information concerning science and wildlife abound.

Television is a dominant force in wildlife education, and its focus on single animals or single species ignores landscape concepts and sends the wrong message on wildlife conservation. In school, the testing regime discourages complex thought, and without an adequate knowledge base to build on, exploring more complex ideas is difficult. There is also a growing distrust of science, and government agencies shy away from controversial topics. Linking current research with the solutions to environmental problems will demonstrate the value of sound science.

The public and nature are largely disconnected.

Increasingly, kids are not connected to outdoors and wildlife, whether at home or at school. There is also a disconnect between where students are taught about nature and where they live. Wildlife education should be matched to the setting where people live, not just to wild places. A connection is needed between the day-to-day lives of students and wildlife conservation if we expect students to value wildlife and the environment. Wildlife education programs need problem-solving dilemmas that help students understand the connection between wildlife and themselves. Connecting students to wildlife research-and-monitoring projects in the field and lab and broadly engaging community partnerships to schools for community service–learning partnerships will provide students with real-life experiences.

Cultural and demographic differences and changes require different approaches.

The demographics of the state continue to be more diverse and more urban. Wildlife conservation educators must find a way to reach all kids in a population that is culturally and geographically diverse. Different ethnic groups have different views of wildlife. Unfortunately, there is a distinct lack of cultural diversity among providers, which inhibits the incorporation of wildlife conservation values into all segments of the population. Materials in Spanish and other languages are also needed.

Funding is generally limited for wildlife education.

It is especially difficult to find funding for field trips and transportation. Access to field trip sites can also be difficult. State and federal agencies are not strongly committed to wildlife education, thus it is not prioritized for funding.

Needs Identified

Wildlife conservation educators have an array of challenges to overcome if they are to successfully train the next generation of engaged and informed decision-makers about the environment in which they live. Reconnecting people with nature and providing them with a sense of place, regardless of where they live, is the key challenge but one that can be met. Progress must be made in the following areas to advance wildlife conservation education broadly in the state:

Break down barriers to wildlife education in formal education.

- Ensure that wildlife education remains in the model curriculum (EEI) and in the science content standards test.
- Create an effective marketing approach to inform teachers of free wildlife education training and the California Regional Environmental Education Community (CREEC), and increase travel funding for students.

Pool and coordinate resources into a wildlife education delivery system.

- Develop funding sources for needed programs.
- Establish dedicated contacts within agencies for wildlife education, perhaps through CREEC.
- Create a point position for statewide wildlife education coordination that is connected to the field.
- Develop opportunities for staff from different programs and agencies to meet at conferences and social functions to learn what each is doing and to network on potential opportunities.
- Inventory wildlife education materials and resources, including a gap analysis, and then fill the gap.

Correct misconceptions about science and wildlife education.

- Provide the legislature and media with wildlife mini-trainings.
- Encourage media advocacy among students to address issues, and encourage teachers to use media in critical-thinking activities.
- Develop a "wildlife misconception and myths" Web site/handbook.
- Promote the concept of peer-reviewed science; e.g., via strategic-message campaign and training.
- CREEC should develop awards for the 10-worst and 10-best environmental messages.

- Support efforts by the Association of Environmental and Outdoor Education, the California Science Teachers Association, California Building a Presence for Science, and others to improve training of teachers, naturalists, non-formal educators, et al.

Reconnect people to nature.

- Help children understand their connection with the natural landscape of today and before the onset of human settlement by promoting place-based learning and comparing the built environment to the natural environment.
- Ensure that all students are given an opportunity to participate in outdoor education, a concept that should be part of a "Children's Outdoor Bill of Rights."
- Connect with the school yard, the Internet, and other opportunities, and train teachers to bring the outdoors inside.
- Encourage city redevelopment projects to include parks, open space, and community gardens to give children exposure to urban wildlife.
- Promote connections to environmental justice issues.

Address cultural and demographic differences and population changes.

- Create outreach programs for specific communities with the California Association of Bilingual Educators and train recreational leaders as nonformal educators.
- Educate real estate agencies on the natural environment, economic values of wildlife, living with bears and mountain lions, etc., so that they can provide accurate information to clients.
- Develop a culturally diverse docent- and outdoor-educators pool trained in wildlife education.

Enhance funding for wildlife conservation education.

- Support state bond funding for capital costs of education infrastructure at nature centers, wildlife reserves, open space areas and parks.
- Lobby Congress to amend the State Wildlife Grants program to authorize funding for wildlife conservation education.
- Include wildlife education as part of funding for projects in transportation, habitat restoration, mitigation, water consumption, and other well-funded, environmentally based projects.
- Create incentive funds for schools and others to provide wildlife education.

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